APPENDICES: PROMOTING POSITIVE PARENT-CHILD RELATIONSHIPS THROUGH EARLY HEAD START HOME VISITS

Appendix A: Analytic Sample and Methods

Analytic sample

In this brief, we explore three research questions:

1. How do Early Head Start programs support positive parent-child relationships in families that receive home-based services, including:

   a. How do program goals support positive parent-child relationships? How common are professional development opportunities that are designed to improve parent-child relationships?

   b. What are the characteristics of home visits, including their frequency and content?

2. What is the quality of relationships for families in Early Head Start who receive home-based services; specifically:

   a. What is the quality of the relationship between the parent and the home visitor?

   b. What is the quality of the relationship between the parent and the child?

3. Are supports from the program and characteristics of the home visit associated with more positive parent-child relationships, and does the relationship between the parent and the home visitor seem to be driving these associations?

We used data from the 2018 round of the Early Head Start Family and Child Experiences Survey (Baby FACES 2018). Baby FACES 2018 is a nationally representative descriptive study of Early Head Start programs. The study collected data about Early Head Start programs, centers, staff, and families through a series of survey instruments, including a program director survey, center director survey, staff (teacher/home visitor) survey, parent survey, staff (teacher/home visitor) child report, and parent child report.[1]

To explore Research Questions 1 and 2, we analyze data from the following:

1. 100 Early Head Start programs that reported offering home-based services, including information about their program goals regarding responsive parent-child relationships (program director survey)

2. 586 home visitors, including information about the home visitors' training and coaching in positive parent-child relationships and their use of curricula (home visitor survey)

3. 589 children and families receiving home-based services (sampled from home visitors), including information about the frequency and content of their recent home visits (home visitor staff child report), the quality of the parent-home visitor relationship (home visitor staff child report and parent survey), and the quality of the parent-child relationship (parent child report)

For Research Question 3, we limit the sample to the 483 families in which the parent reported on the quality of the parent-child relationship (parent child report). In addition to the information described above, our analyses draw on family characteristics (parent survey and parent child report) and the characteristics of the 231 home visitors who serve these families (home visitor staff survey). In Appendix B, we provide descriptive statistics for the subsample of families, home visitors, and programs included in the multivariate analyses.

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[1] Within each of the 137 programs that agreed to participate, Baby FACES 2018 sampled an average of four centers and/or six home visitors, depending on the types of services provided by the program. Among the six sampled home visitors per program, Baby FACES subsampled an average of three home visitors and then up to three families/children from each of these subsampled home visitors.

Analytic methods

The first two research questions are descriptive. We calculated means and percentages, using analysis weights to account for complex multilevel sampling and nonresponse at particular levels. That is, families are nested within home visitors' caseloads, which are in turn nested within programs, and there could be nonresponse at one or more of these levels (families, home visitors, and program directors) to one or more of the Baby FACES survey instruments. For all descriptive analyses, we calculated the standard errors based on the weighted estimates. In addition, to explore how Early Head Start home visitors responded to families who may need more support for parent-child interactions, we compared families who are in the area of concern for parent-child interactions (as defined by the developer of the Healthy Families Parenting Inventory Parent-Child Interaction scale) and those that are not with respect to (1) the frequency and content of home visits and (2) the quality of their relationship with their child's home visitor. We tested for differences between the two groups with an independent samples *t*-test for continuous variables and a chi-square test for categorical variables.

To explore Research Question 3, we first used a multilevel regression model with full information maximum likelihood (FIML) estimation in Mplus to examine the relative strength of associations of program-level supports and home visit characteristics with parent-child relationships. Baby FACES 2018 collected three measures of the parent-child relationship, and we analyzed each measure separately.[2] We used analysis weights to account for the 106 families excluded from the multivariate analyses because of parent nonresponse to the parent child report.

The multilevel models account for the nesting of families within home visitors' caseloads and controlled for family and home visitor characteristics. The Level 1 models include child and family characteristics. The Level 2 models include both home visitor characteristics and associated program features.[3] In Exhibit A.1, we list the variables used in these analyses at each level of the models. The models include random intercepts, which allow the quality of parent-child relationships to vary across home visitors.

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[2] Of the 483 families included in the multivariate analyses, some families were missing data on some but not all dependent variables. As a result, 477 families were included in all three models, 4 families were included in two models, and 2 families were included in only one model.

[3] Program-level variables are included in the Level 2 model because of too little variability at the program level to justify the added complexity of modeling a third level. Too little variation at the third level can lead to convergence issues, unstable estimates, and large standard errors (Preacher 2011).

Exhibit A.1. Variables for multilevel analyses examining factors associated with parent-child relationships

Category of variables	Variables[a]
Dependent variables[b]	CPRS Closeness scores; CPRS Conflict scores; HFPI Parent-Child Interaction scores
Child/family variables (level 1)	**Factors examined:** Family had four or more home visits in past four weeks; family discussed parent-child interaction at home visit in past four weeks; family discussed developmentally appropriate care and routines at home visit in past four weeks; family discussed discipline and behavior management at home visit in past four weeks
	Child and family characteristics (covariates): Child's age (in months); child is a girl; child has special needs (according to parent reports); parent is mother or female guardian of child; parent's race/ethnicity (entered as three indicators denoting Hispanic, African American non-Hispanic, and other race non-Hispanic with White non-Hispanic as the referent group); parent's and home visitor's race and ethnicity match; household income-to-poverty ratio; household has high demographic risk[c]; parent's HFPI Social Support scale score is the in area of concern[d]; parent's CESD-R score (a measure of the parent's depressive symptoms); parent's PSI-4-SF total score (a measure of the parent's level of parenting stress in relation to the study child); CHAOS score (a measure of the level of confusion and disorganization at home)
Home visitor and program variables (level 2)	**Factors examined[e]:** Home visitor received training in positive parent-child relationships in last year and a lot of coaching in parent-child relationships[f]; home visitor works in program that sets forth written plans to achieve goals regarding responsive parent-child relationships[g]
	Home visitor characteristics (covariates): Home visitor has bachelor's degree or higher; home visitor has CDA; home visitor's degree focused on ECE; home visitor's years of experience (entered as three indictors denoting one year of experience or less, 2 to 4 years of experience, and 5 to 9 years of experience with 10 or more years of experience as the referent group)
Mediator variables[h]	WAI total score (parent report); CRQ Support score; Parent satisfaction with home visits

Note: Parent and primary caregiver are used to distinguish between the parent who responded to the parent child report and the parent survey, respectively. The parent and primary caregiver were often, but not always, the same. For simplicity, we use "parent" to denote the parent and primary caregiver.

[a] In Mplus, we standardized all continuous variables and fixed the variances of binary independent variables (factors examined and characteristics of children, families, and home visitors) to their observed variance to prevent convergence problems that can occur when estimating two-level models (Muthén and Muthén 2017).

[b] Before standardizing the dependent variables, we transformed them to address outliers.

[c] See Xue et al. (2021) for a description of the demographic risk index.

[d] The developer defined cutoff scores indicating areas of concern.

[e] Preliminary versions of these analyses (Baxter et al. 2020; Baxter et al. 2021) included whether the home visitor uses a curriculum that is designated as an evidence-based curriculum as a factor to be examined. Home visitors reported the curricula they use and Baby FACES 2018 identified which of these are a curriculum of a home visiting model that has met U.S. Department of Health and Human Services criteria for an evidence-based early childhood home visiting model as determined by the Home Visiting Evidence of Effectiveness (HomVEE) review. This factor was difficult to interpret because many curricula that home visitors reported using are not curricula of models that have been reviewed by HomVEE. Therefore, we dropped this factor from our final analyses.

[f] We focus on the combination of training and a lot of coaching because most home visitors had received training related to parent-child relationships and research suggests that professional development is most effective when several methods are combined, such as training and coaching.

[g] Most programs set forth goals related to responsive parent-child relationships and had put in place processes to evaluate their progress toward these goals. Therefore, we focused on whether programs had written plans to guide achievement of goals related to responsive parent-child relationships, which was relatively less common.

[h] Mplus uses latent variable decomposition to parse the variance of the mediator into within and between components. It then models these components on Level 1 and Level 2, respectively.

CDA = Child Development Associate Credential; CESD-R = Center for Epidemiologic Studies Depression Scale-Revised; CHAOS = Confusion, Hubbub, and Order Scale; CPRS = Child Parent Relationship Scale; CRQ = Cocaring Relationship Questionnaire; ECE = Early Childhood Education; HFPI = Healthy Families Parenting Inventory; PSI-4-SF = Parenting Stress Index, Fourth Edition Short Form; and WAI = Working Alliance Inventory.

Next, we examined whether the quality of the parent-home visitor relationship mediates these associations by conducting a multilevel path analysis in Mplus. We used a multilevel structural equation model framework (Preacher et al. 2010) to build the path analysis model in Mplus. In Exhibit A.1, we list the variables used to measure the quality of the parent-home visitor relationship.

For mediation to be supported, the factor examined needs to be statistically significantly associated with the dependent variable, thus providing a relationship to be mediated. More specifically, three criteria must be met for testing mediation (Exhibit A.2):

- **Path 1**: The program support/home visit characteristic (the factor examined) must be statistically significantly associated with parent-child relationship quality (the outcome);

- **Path 2**: The factor examined must be statistically significantly associated with parent-home visitor relationship quality (the mediator); and
- **Path 3**: The mediator must be statistically significantly associated with the outcome.

Exhibit A.2. Mediation happens when Paths 2 and 3 explain Path 1
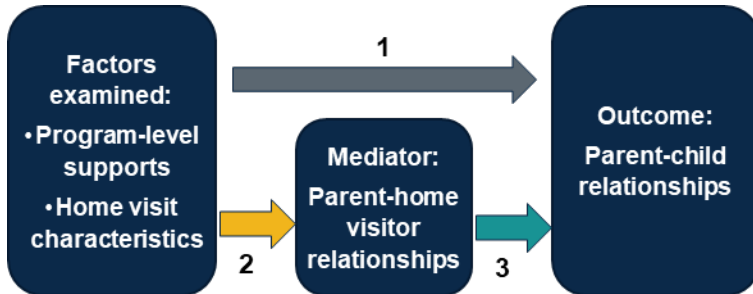
Therefore, we fit a path analysis mediation model for each parent-child relationship measure that was statistically significantly associated with a program support or home visit characteristics. The path analysis model simultaneously estimates (1) associations between (or the path from) the factors examined (program support and home visit characteristics) and the outcome (the quality of the parent-child relationship), (2) associations between (or the path from) the factors and the mediator (the quality of the parent-home visitor relationship), and (3) associations between (or the path from) the mediator and the outcome after controlling for the other characteristics.

If mediation exists, the associations described by paths 2 and 3 will be statistically significant, but the statistically significant association between the factor examined and the dependent variable (path 1) will be reduced or eliminated. The statistically significant association between the factor examined and the outcome is weakened or eliminated after accounting for the mediator because the mediator is the underlying mechanism that explains this association.

We took two steps to prevent convergence problems in the Mplus path analysis models. First, we used a composite score of three parent-reported measures of the quality of the parent-home visit relationship rather than modeling each measure separately.[4] We focused the multivariate model on the parent reports of the parent-home visitor relationship, given that this brief focuses on parents' perceptions of the parent-child relationship. Parent reports of the quality of the parent-home visitor relationship were also more closely associated with parent-child relationship measures than home visitor reports of these relationships. Second, we trimmed the child/family and home visitor characteristics in the model to only those that were statistically significant in the multilevel analyses. If one of these characteristics was not statistically significantly associated with any of the three parent-child relationships measures in the multilevel models, we dropped it from the path analyses with one exception. We retained child's gender as a covariate in the path analyses. Although it was not statistically significant in the multilevel analyses, gender is conceptually important when examining conflict in the parent-child relationship.

Addressing missing data

For Research Questions 1 and 2, we calculated all descriptive statistics based on valid data. For Research Question 3, we limited our multivariate analyses to the 483 families reporting on at least one parent-child relationship measure and used FIML estimation in Mplus. FIML uses all available information in estimating the associations to account for missing data in the factors examined, mediator, and child/family and home visitor characteristics.

Coverage, or the percentage of households with valid data, is generally high and ranges from 76 to 100 percent. Most of the missing data are attributable to parent nonresponse to the parent survey. Household income as a percentage of the federal poverty level accounts for the largest amount of missing data (missing for 24 percent),

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[4] We constructed a composite score of the quality of the parent-home visitor relationship by standardizing each variable and then taking an average of the three z-scores. Composite scores are missing if any of the three variables is missing. Cronbach's alpha for the three measures is 0.75. We conducted a confirmatory factor analysis by using structural equation modeling; factor loadings were statistically significant and all greater than 0.40.

followed by whether the parent and home visitor have the same race and ethnicity (missing for 16 percent) and the composite measure of the parent-home visitor relationship quality (missing for 15 percent).

Limitations of the analyses

The major limitation of these analyses is that they cannot address causality or provide evidence that the program causes changes in outcomes. Given the cross-sectional design, we cannot account for previous scores on the outcomes of interest in any of the analyses. Moreover, we cannot draw conclusions about the direction of the associations. For example, although we can look at concurrent associations between parent-child relationships and characteristics of the home visit, we recognize that the findings are possibly misleading. For example, we might observe that parents who receive home visits more often respond more sensitively to their children as compared to parents who receive home visits less often; however, we cannot conclude that the frequency of the home visits caused parents to be more sensitive to their child. An equally plausible explanation is that parents who are highly responsive to their child may be more likely to request (or keep appointments for) more frequent home visits than parents who are less responsive to their children.

Our models also do not account for the nesting of home visitors within programs. Ignoring nesting at this level is not likely to change (or bias) the fixed parameter estimates (that is, the magnitude or coefficients for the factors examined, mediators, and child/family and home visitor characteristics), though it will bias the standard errors. However, bias is particularly a concern when variance in the ignored level is high (Van den Noortgate et al. 2005), which is not the case for these analyses. In fact, too little variation at the third level, which is the case for these analyses, can lead to large standard errors and less precise estimates, when including a third level in the model (Preacher 2011). Therefore, even though it is essential to exercise caution when interpreting measures for statistical inferences, tests of statistical significance, and confidence intervals, we believe that little bias was introduced by ignoring the third (program) level in our analyses.

As is common with many large-scale survey data sets, our analyses include small cluster sizes. Cluster sizes range from one to three, and only one family is observed for 27 percent of home visitors in our multivariate model (referred to as "singletons" in the literature). Fixed parameter estimates are largely robust to small cluster sizes and high proportions of singletons, but the confidence intervals for our Level 2 fixed parameter estimates may suffer from some bias (Bell et al. 2010; Clarke and Wheaton 2007).[5] Therefore, measures for statistical inferences for our Level 2 fixed parameter estimates should be interpreted with caution. However, our relatively large sample size of 231 clusters likely buffers the interval estimates from significant bias (Bell et al. 2010).

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[5] Small cluster sizes and singletons also bias random-effects parameter estimates, also known as estimates of the variance components. We do not present and discuss these random effects in this brief because they are not a focus of our research questions.

Appendix B: Detailed Results for Research Questions 2 and 3

As described in the brief, as a part of research question 2, we explored whether home visitors might respond differently to families who need relatively more support for their parent-child interactions. Specifically, we compared families in two groups—those with Healthy Families Parenting Inventory parent-child interaction scores inside the area of concern, and those with scores outside the area of concern—on the characteristics of their home visit and the quality of their relationship with the home visitor. The results of those analyses are presented in Exhibit B.1 and discussed in the brief.

Exhibit B.1. Home visit characteristics and parent-home visitor relationship quality by the quality of parent-child interactions

	Families outside area of concern		Families inside area of concern		
	Sample size	Percentage/ mean (SE)	Sample size	Percentage/ mean (SE)	*p*-value
Frequency and content of home visits					
What percentage of families received 4 or more visits in the past 4 weeks?[a]	367	56.2 (3.66)	71	58.5 (8.58)	0.79
What percentage of families had these parenting behavior topics discussed at a home visit in the past 4 weeks?[b]	353		68		
Parent-child interaction		66.9 (3.53)		73.5 (5.85)	0.28
Developmentally appropriate care and routines		53.6 (4.64)		58.7 (6.24)	0.50
Discipline and behavior management		38.1 (4.81)		40.9 (8.24)	0.76
Parent-reported measures of relationship quality with home visitor					
What are the mean WAI scores reported by parents?					
Tasking	343	18.5 (0.15)	69	17.6 (0.26)	0.01*
Bonding	344	19.3 (0.13)	69	19.4 (0.20)	0.70
Goal setting	343	17.8 (0.20)	69	17.2 (0.34)	0.14
Total score	342	55.6 (0.42)	69	54.2 (0.59)	0.08
What is the mean score on Parent Satisfaction with Home Visits?	344	4.7 (0.03)	69	4.7 (0.06)	0.80
What is the mean CRQ score reported by parents?	342	14.3 (0.13)	69	13.8 (0.32)	0.08

Source: Spring 2018 Baby FACES Parent Survey and Staff (Home Visitor) Child Report.

Note: Statistics are weighted to represent Early Head Start home visitors and parents receiving home-based services. The sample size column in this table presents unweighted sample sizes to identify the number of responses to the parent survey or home visitor child report that had valid data on each measure, out of total samples of 421 survey responses from parents receiving home-based services and 445 home visitor child report responses.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

[a] Includes families that home visitors reported having no contact with in the past four weeks (n = 6).

[b] Based on families with at least one visit from the home visitors during the past four weeks (n = 431).

CRQ = Cocaring Relationship Questionnaire; SE = standard error; WAI = Working Alliance Inventory.

As described in Appendix A, we limit the analytic sample for the multivariate analysis to the subsample of families, sampled from a home visitor, who responded to the parent child report. For this subsample of families, we provide descriptive statistics for the variables used in the multivariate analyses in Exhibit 7 in the brief (dependent variables), Exhibit B.2 (factors examined and mediators), Exhibit B.3 (family and child characteristics), and Exhibit B.4 (home visitor characteristics).

In Exhibit B.2, we describe the prevalence of the program-level supports and home visit characteristics and the quality of parent-home visitor relationships for the subsample of families included in the multivariate analysis. After comparing these estimates to Exhibits 2 through 6 in the brief, we find that the program-level supports, home visit

characteristics, and parent-home visitor relationships for this subsample mirror the estimates presented for the full sample in the brief.

Exhibit B.2. Descriptive statistics for program supports, home visit characteristics, parent-home visitor relationship measures, and home visitor characteristics for the analytic sample used in the multivariate analysis (percentage unless otherwise specified)

Factors examined and mediators	Sample size	Percentage/ mean (SE)	Reported range
Program-level supports			
Program has set forth written plans to achieve goals related to parent-child responsive relationships[a]	80	72.2 (6.12)	n.a.
Home visitor received both training and a lot of coaching in positive parent-child relationships	220	32.6 (4.12)	n.a.
Home visit characteristics			
Family had four or more home visits in past four weeks[b]	440	56.5 (3.58)	n.a.
Family discussed parenting behavior topics during home visits in past four weeks:[c]	423		n.a.
Parent-child interaction		67.6 (3.31)	
Developmentally appropriate care/routines		54.4 (4.07)	
Discipline/behavior management		38.3 (4.29)	
Parent-home visitor relationship measures			
Mean parent-reported WAI total score	412	55.3 (0.36)	21.7–60.0
Mean Parent Satisfaction with Home Visits	414	4.7 (0.02)	2.6–5.0
Mean CRQ Support score	412	14.2 (0.13)	2–15

Source: Spring 2018 Baby FACES Program Director Survey, Staff (Home Visitor) Survey, Staff (Home Visitor) Child Report, and Parent Survey.

Note: Statistics are weighted to represent Early Head Start programs, home visitors, and families who were sampled from home visitors' caseloads, including those families receiving home-based services only and those receiving a combination of center- and home-based services. The sample size column presents unweighted sample sizes to identify the number of surveys with valid data on each item, out of a total sample of 96 program director surveys, 226 home visitor surveys, 445 home visitor child report responses, and 421 parent surveys.

[a] Among programs that have set forth goals for parent-child responsive relationships (n = 83).

[b] Sample size includes families with which home visitors reported no contact in the past four weeks (n = 6).

[c] Among families who received at least one visit from the home visitor during the past four weeks (n = 431).

CRQ = Cocaring Relationship Questionnaire; n.a. = not applicable; SE = standard error; WAI = Working Alliance Inventory.

To isolate the role of the program supports and home visit characteristics on the quality of the parent-child relationship, our models account for a set of child and family characteristics that may influence the parent-child relationship. In Table B.3, we present these characteristics for the 483 families included in the multivariate analysis.[6] We also compare the characteristics of these families to the 106 families excluded from these analyses.[7]

Among the characteristics available for both those included and excluded from the multivariate analyses, the two groups statistically significantly differed on two characteristics. Households that responded to the parent child report—and therefore are included in the analysis—had higher levels of confusion and disorganization at home, as measured by the Confusion, Hubbub, and Order Scale (CHAOS), and they faced more economic pressure, as measured by the Economic Strain Questionnaire, relative to households that did not respond to the parent child

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[6] We did not include Family Environment Scale scores in the multivariate model because the measure has a large amount of missing data and is relevant only to two-adult households. We did not include families' level of economic pressure because the model already includes a measure of household income and demographic risk.

[7] Characteristics collected from the parent child report are unavailable for families excluded from the analysis because those families did not respond to the parent child report. When data were available for both groups, we tested for differences between the two groups with an independent samples *t*-test for continuous variables and a chi-square test for variables with more than one category (for example, race/ethnicity).

report—and therefore were excluded from the analysis. As noted, we use analysis weights in the model to account for families excluded from the model because of nonresponse to the parent child report.

Exhibit B.3. Characteristics of Early Head Start families receiving home-based services, by whether the family is included in the multivariate analysis sample (percentages, unless otherwise indicated)

| Characteristics | In brief sample | | Not in brief sample | | |
	Sample size	Percentage/ mean (SE)	Sample size	Percentage/ mean (SE)	p-value
Parent child report					
Parent's relationship to the child	482		n.a.	n.a.	n.a.
Child's mother/female guardian		90.8 (2.00)			
Child's father/male guardian		6.5 (1.87)			
Child's grandparent		2.0 (0.67)			
Other relative or nonrelative		0.6 (0.46)			
Child's age (in months) at parent child report	481		n.a.	n.a.	n.a.
12 months or younger		15.4 (1.89)			
13 to 24 months		35.3 (2.65)			
25 to 36 months		35.9 (2.49)			
More than 36 months		13.5 (1.79)			
Mean child's age (in months, at parent child report)	481	24.1 (0.62)	n.a.	n.a.	n.a.
Demographic characteristics					
Child is a girl	482	0.5 (0.03)	106	0.5 (0.06)	
Child's race/ethnicity	414		90		
Hispanic/Latino		48.0 (4.39)		49.6 (9.49)	
African American, non-Hispanic		10.2 (2.36)		13.7 (5.49)	
White, non-Hispanic		35.0 (4.24)		27.3 (7.79)	
Other, non-Hispanic		6.8 (1.67)		9.3 (4.29)	
Parent's race/ethnicity	417		92		
Hispanic/Latino		48.1 (4.54)		48.3 (9.54)	
African American, non-Hispanic		11.2 (2.45)		14.6 (6.01)	
White, non-Hispanic		35.0 (4.13)		33.4 (8.09)	
Other, non-Hispanic		0.7 (0.51)		3.6 (2.00)	
Household income as a percentage of the poverty level for families receiving home-based services?[a]	382		103		
0–50 percent of the poverty level		22.1 (2.47)		27.1 (5.95)	
51–100 percent of the poverty level		44.5 (3.57)		44.6 (5.89)	
101–130 percent of the poverty level		15.2 (2.13)		14.7 (3.66)	
131 percent of the poverty level or higher		18.2 (2.48)		13.6 (3.63)	
Mean household incomes as a percentage of the poverty level[a]	367	99.6 (10.05)	78	85.3 (7.15)	
Demographic risk index[b]	419		91		
Low risk (2 or fewer)		63.3 (3.59)		56.2 (6.88)	
Medium risk (more than 2, fewer than 4)		24.6 (2.75)		28.6 (6.24)	

Exhibit B.3 *(continued)*

Characteristics	In brief sample		Not in brief sample		*p*-value
	Sample size	Percentage/ mean (SE)	Sample size	Percentage/ mean (SE)	
High risk (4 or more)		12.1 (1.69)		15.2 (5.11)	
Child has special needs, according to parent reports?	478	30.7 (2.62)	n.a.	n.a.	n.a.
Household environment measures					
Mean CHAOS score	414	12.6 (0.45)	89	10.6 (0.73)	**
Mean Family Conflict subscale score (Family Environment Scale)[c]	341	1.6 (0.03)	75	1.5 (0.06)	
Parent well-being measures					
Parent's depressive symptoms (CESD-R score) are not potentially clinically significant	413	96.2 (1.22)	89	90.7 (3.88)	
Parent's level of social support (HFPI Social Support scale score) is outside area of concern[d]	481	78.1 (2.81)	n.a.	n.a.	n.a.
Parent does not have parenting stress (PSI-4-SF score) of clinical significance[e]	472	95.7 (1.19)	n.a.	n.a.	n.a.
Family's level of economic pressure[f]	408	9.5 (0.36)	89	7.9 (0.68)	*
Sample size	**483**		**106**		

Source: Spring 2018 Baby FACES Parent Survey and Parent Child Report.

Note: Statistics are weighted to represent all Early Head Start families who were sampled from home visitors' caseloads, including those families receiving home-based services only and those receiving a combination of center- and home-based services.

The sample size column presents unweighted sample sizes to identify the number of parent surveys with valid data on each of the measures out of a total sample of 513 parent survey responses and 483 parent child report responses of parents receiving home-based services. Parent and primary caregiver are used to distinguish between the parent who responded to the parent child report and the parent survey, respectively. The parent and primary caregiver were often, but not always, the same. For simplicity, we use "parent" to denote the parent and primary caregiver.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

[a] Poverty level is adjusted for household size according to 2019 HHS poverty guidelines.

[b] See Xue et al. (2021) for a description of the demographic risk index.

[c] Among families with at least two adults, age 18 and older, living in the household (or who did not respond to the question).

[d] The developer defined cutoff scores indicating areas of concern.

[e] The developer defined cutoff scores suggesting clinically significant levels of stress.

[f] As measured by six items adapted from Conger and Elder's (1994) Economic Strain Questionnaire.

CESD-R = Center for Epidemiologic Studies Depression Scale-Revised; CHAOS = Confusion, Hubbub, and Order Scale; HFPI = Healthy Families Parenting Inventory; n.a. = not applicable; PSI-4-SF = Parenting Stress Index, Fourth Edition Short Form; SE = standard error.

In Table B.4, we describe the education and experience of the 231 home visitors who served the 483 families included in the multivariate analysis. In addition, we report the percentage of families whose home visitor was of the same race and ethnicity as the parent. We include these variables in our multivariate model because of their potential to influence the home visitor's ability to work with the parent to improve the parent-child relationship.

Exhibit B.4. Home visitor characteristics used in the multivariate analysis

Characteristics	Sample size	Percentage (SE)
Home visitor has bachelor's degree or higher	224	55.3 (4.56)
Home visitor has CDA	220	41.6 (4.13)
Home visitor's postsecondary field of study includes early childhood education or prenatal/infant/toddler development	223	69.3 (3.61)
Home visitor's years of experience as a home visitor:	225	
One year or less		23.2 (3.44)
2 to 4 years		29.5 (3.29)
5 to 9 years		24.6 (3.95)
10 or more years		55.3 (4.56)
Parent and home visitor have the same race/ethnicity	375	70.0 (3.53)

Source: Spring 2018 Baby FACES Staff (Home Visitor) Survey and Parent Survey.

Note: Statistics are weighted to represent Early Head Start home visitors and families who were sampled from home visitors' caseloads, including those families receiving home-based services only and those receiving a combination of center- and home-based services. The sample size column presents unweighted sample sizes to identify the number of surveys with valid data on each item out of a total sample of 226 home visitor surveys and 421 parent surveys.

CDA = Child Development Associate Credential; SE = standard error.

After examining the descriptive statistics for the variables used in the analysis, we examined correlations among each of these program-level supports and home visit characteristics in order to arrive at a better understanding of how they relate to one another (Exhibit B.5). Some program-level supports and home visit characteristics are weakly related. When programs had set forth written plans to achieve goals related to responsive parent-child relationships, their home visitors tended to discuss developmentally appropriate care and routines with families during the home visits. Parenting behavior topics are also related, suggesting that home visitors tended to cover them together. Home visitor professional development and the frequency of home visits do not correlate with any of the other factors.

Exhibit B.5. Correlations of factors examined in the multivariate analysis analytic sample

	1	2	3	4	5
Program goals related to responsive parent-child relationships and written plans to achieve these goals					
Home visitor received both training and a lot of coaching in positive parent-child relationships	0.026				
Family had four or more visits in past four weeks	-0.040	0.043			
Discussed parent-child interaction at home visits in past four weeks	-0.028	0.029	-0.007		
Discussed developmentally appropriate care/routines at home visits in past four weeks	0.275***	-0.037	0.003	0.301***	
Discussed discipline/behavior management at home visits in past four weeks	0.050	-0.073	0.024	0.212***	0.367***

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

In Exhibits B.6 through B.8, we report the standardized regression coefficients and standard errors from the multilevel models and the multilevel mediation path analyses conducted in Mplus.

Exhibit B.6. Standardized regression coefficients from multilevel models examining associations of program supports and home visit characteristics and parent-child relationship quality

	HFPI Parent-Child Interaction	CPRS Closeness	CPRS Conflict
Level 1 factors: Home visit characteristics			
Family had four or more home visits in past four weeks	-0.049 (0.085)	-0.057 (0.090)	0.018 (0.076)
Family discussed parenting behavior topics at home visits in past four weeks:			
Parent-child interaction	0.029 (0.088)	0.082 (0.099)	-0.090 (0.089)
Developmentally appropriate care/routines	-0.104 (0.094)	-0.021 (0.098)	0.206 (0.092)*
Discipline/behavior management	0.041 (0.098)	0.106 (0.101)	-0.003 (0.100)
Level 2 factors: Program-level supports			
Program has set forth written plans to achieve goals related to responsive parent-child relationships	0.211 (0.087)*	0.126 (0.104)	-0.010 (0.073)
Home visitor received both training and a lot of coaching in positive parent-child relationships	-0.032 (0.092)	-0.014 (0.108)	0.026 (0.079)
Level 1 covariates: Child/family characteristics			
Child's age	-0.076 (0.041)	0.326 (0.045)***	0.167 (0.038)***
Child is a girl	0.103 (0.077)	0.045 (0.087)	-0.026 (0.074)
Child has special needs, according to parent reports	0.044 (0.088)	-0.373 (0.097)***	0.113 (0.086)
Child's parent is child's mother/female guardian	0.090 (0.129)	-0.170 (0.132)	-0.049 (0.146)
Parent's race/ethnicity:			
White, non-Hispanic (referent)			
Hispanic/Latino	-0.125 (0.091)	-0.066 (0.107)	0.014 (0.084)
African American, non-Hispanic	0.042 (0.118)	0.003 (0.168)	-0.087 (0.156)
Other, non-Hispanic	0.151 (0.189)	0.369 (0.194)	0.025 (0.177)
Parent and home visitor are of same race/ethnicity	-0.091 (0.106)	0.215 (0.119)	0.102 (0.099)
Household income as a percentage of the poverty level	0.049 (0.030)	0.038 (0.023)	-0.108 (0.044)*
Demographic risk index is high	-0.011 (0.122)	0.112 (0.130)	-0.066 (0.140)
Parent's HFPI Social Support scale score is in the area of concern	-0.409 (0.118)***	-0.256 (0.097)**	0.119 (0.101)
Parent's CESD-R score (depressive symptoms)	0.003 (0.050)	0.050 (0.054)	0.020 (0.046)
Parent's PSI-4-SF total score (parenting stress)	-0.381 (0.048)***	-0.197 (0.053)***	0.440 (0.047)***
Household CHAOS score	-0.194 (0.047)***	-0.072 (0.053)	0.130 (0.051)**
Level 2 covariates: Home visitor characteristics			
Home visitor has bachelor's degree or higher	-0.003 (0.084)	0.118 (0.098)	-0.052 (0.075)
Home visitor has CDA	0.058 (0.087)	0.116 (0.101)	0.065 (0.072)
Home visitor's postsecondary field of study includes early childhood education or prenatal/infant/toddler development	0.073 (0.102)	-0.085 (0.098)	0.140 (0.075)
Home visitor's years of experience as a home visitor:			
One year or less	0.074 (0.130)	0.070 (0.162)	-0.088 (0.126)
2 to 4 years	0.063 (0.103)	0.015 (0.136)	-0.015 (0.103)
5 to 9 years	-0.046 (0.113)	-0.056 (0.149)	0.190 (0.102)
10 or more years (referent)			

Exhibit B.6 *(continued)*

Note: Standardized regression coefficients are reported. Standard errors appear in parentheses.

Statistics are weighted to represent Early Head Start families who were sampled from home visitors' caseloads, including those families receiving home-based services only and those receiving a combination of center- and home-based services.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

CDA = Child Development Associate Credential; CESD-R = Center for Epidemiologic Studies Depression Scale-Revised; CHAOS = Confusion, Hubbub, and Order Scale; CPRS=Child Parent Relationship Scale; HFPI = Healthy Families Parenting Inventory; PSI-4-SF = Parenting Stress Index, Fourth Edition Short Form.

Exhibit B.7. Standardized regression coefficients from path analysis examining parent-home visitor relationship as a mediator for HFPI Parent-Child Interaction scores

	Path from program support and home visit characteristics to quality of parent-child relationship: HFPI Parent-Child Interaction	Path from program support and home visit characteristics to quality of parent-home visitor relationship: Composite measure
Level 1 factors: Home visit characteristics		
Family had four or more home visits in past four weeks	-0.077 (0.088)	0.275 (0.089)**
Family discussed parenting behavior topics at home visits in past four weeks:		
Parent-child interaction	0.033 (0.085)	0.021 (0.098)
Developmentally appropriate care/routines	-0.085 (0.090)	-0.018 (0.107)
Discipline/behavior management	0.010 (0.094)	0.041 (0.090)
Quality of parent-home visitor relationship (composite measure)[a]	0.095 (0.061)	
Level 2 factors: Program-level supports		
Program has set forth written plans to achieve goals related to parent-child responsive relationships	0.258 (0.125)*	-0.059 (0.075)
Home visitor received both training and a lot of coaching in positive parent-child relationships	-0.073 (0.137)	0.072 (0.081)
Quality of parent-home visitor relationship (composite measure)[a]	0.762 (1.323)	
Level 1 covariates: Child/family characteristics		
Child's age	-0.066 (0.039)	
Child is a girl	0.103 (0.077)	
Child has special needs, according to parent reports	0.054 (0.084)	
Household income as a percentage of the poverty level	0.053 (0.027)	
Parent's HFPI Social Support scale score is in the area of concern	-0.374 (0.117)***	
Parent's PSI-4-SF total score (parenting stress)	-0.381 (0.043)***	
Household CHAOS score	-0.189 (0.044)***	

Note: Standardized regression coefficients are reported. Standard errors appear in parentheses.

Statistics are weighted to represent Early Head Start families who were sampled from home visitors' caseloads, including those families receiving home-based services only and those receiving a combination of center- and home-based services.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

[a] Path from mediator to outcome. Mplus uses latent variable decomposition to parse the variance of the mediator into within and between components. It then models these components on Level 1 and Level 2, respectively.

CHAOS = Confusion, Hubbub, and Order Scale; CPRS = Child Parent Relationship Scale; HFPI = Healthy Families Parenting Inventory; PSI-4-SF = Parenting Stress Index, Fourth Edition Short Form.

Exhibit B.8. Standardized regression coefficients from path analysis examining parent-home visitor relationship as a mediator for CPRS Conflict scores

	Path from program support and home visit characteristics to quality of parent-child relationship: CPRS Conflict	Path from program support and home visit characteristics to quality of parent-home visitor relationship: Composite measure
Level 1 factors: Home visit characteristics		
Family had four or more home visits in past four weeks	0.064 (0.079)	0.280 (0.089)**
Family discussed parenting behavior topics at home visits in past four weeks:		
Parent-child interaction	-0.068 (0.088)	0.018 (0.098)
Developmentally appropriate care/routines	0.208 (0.086)*	-0.007 (0.104)
Discipline/behavior management	0.000 (0.094)	0.037 (0.090)
Quality of parent-home visitor relationship (composite measure)[a]	-0.014 (0.053)	
Level 2 factors: Program-level supports		
Program has set forth written plans to achieve goals related to parent-child responsive relationships	-0.003 (0.076)	-0.062 (0.075)
Home visitor received both training and a lot of coaching in positive parent-child relationships	0.025 (0.076)	0.075 (0.081)
Quality of parent-home visitor relationship (composite measure)[a]	0.136 (0.324)	
Level 1 covariates: Child/family characteristics		
Child's age	0.173 (0.038)***	
Child is a girl	-0.014 (0.073)	
Child has special needs, according to parent reports	0.082 (0.085)	
Household income as a percentage of the poverty level	-0.102 (0.036)**	
Parent's HFPI Social Support scale score is in the area of concern	0.104 (0.099)	
Parent's PSI-4-SF total score (parenting stress)	0.438 (0.042)***	
Household CHAOS score	0.149 (0.049)**	

Note: Standardized regression coefficients are reported. Standard errors appear in parentheses.

Statistics are weighted to represent Early Head Start families who were sampled from home visitors' caseloads, including those families receiving home-based services only and those receiving a combination of center- and home-based services.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

[a] Path from mediator to outcome. Mplus uses latent variable decomposition to parse the variance of the mediator into within and between components. It then models these components on Level 1 and Level 2, respectively.

CHAOS = Confusion, Hubbub, and Order Scale; CPRS = Child Parent Relationship Scale; HFPI = Healthy Families Parenting Inventory; PSI-4-SF = Parenting Stress Index, Fourth Edition Short Form.

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